

## NOTES AND ABSTRACTS

## RESIGNATION OF THE ASSISTANT EDITOR

Dr. B. M. Varney is terminating his connection with the MONTHLY WEATHER REVIEW as of May 14 in order to go to an associate professorship at the University of California at Los Angeles.

W. W. REED ON CLIMATOLOGICAL DATA FOR THE TROPICAL ISLANDS OF THE PACIFIC<sup>1</sup>

This SUPPLEMENT, as its title indicates, presents statistics of temperature, precipitation, relative humidity, cloudiness, and prevailing winds for the single islands and groups of islands of the Pacific.

The data are presented mostly in the form of monthly and annual means and extremes. Monthly and annual totals of precipitation also are given for a group of selected stations at each of which the record covers a period ranging from 20 to 40 years. The statistics have been compiled from existing publications and assembled under a single cover for easy reference.

The author has completed his task in a very satisfactory manner. Copies of the SUPPLEMENT may be obtained

to Exner the cyclone brings about a complete mixing of the two masses.

The airplane soundings seem definitely to have settled the question.

But not all the difficulties have been resolved. It is certain that the systematic use of the airplane for exploring the atmosphere will in future make a contribution of the highest importance to the study of the problems which confront us. One may criticize the method at present as being limited by altitude, but on the other hand it possesses the enormous advantage over the *ballon sonde* of not being blind.

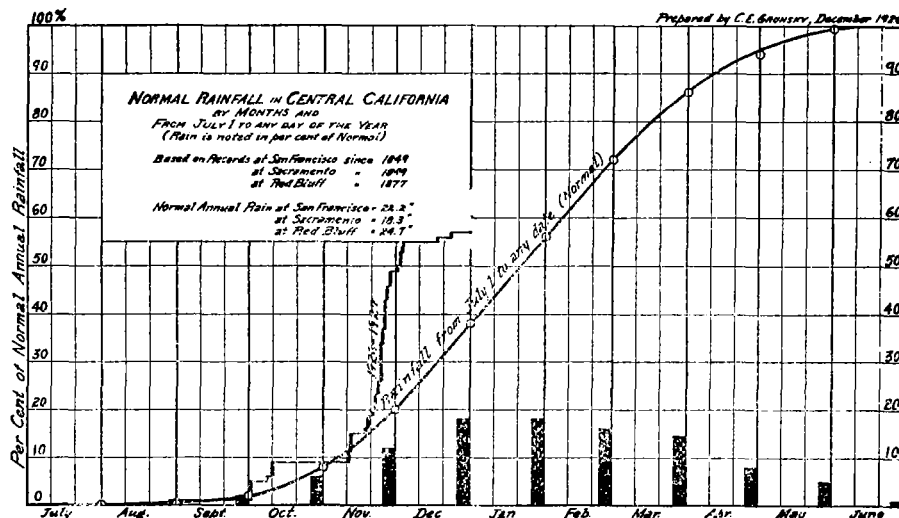
In order to reach its full usefulness, sounding by airplane ought to be carried out by a pilot with a conscientious observer who will carefully note the phenomena observed. It is likewise necessary that the meteorograph be very accurate, and especially that the thermometer record the changes of temperature without lag. It goes without saying that, except in very strongly marked cases, a discontinuity will not be shown if the trace is thickened by vibrations.—*Transl. B. M. V.*

## THE SEASONAL RAINFALL TO ANY DATE

By C. E. GRUNSKY

[San Francisco, Calif., January 1, 1927]

A diagram prepared for use in central portions of California as an aid to a quick and dependable determination of the normal rainfall to any day of the climatic



from the Superintendent of Documents, Washington, D. C., at the price of 10 cents each. Remittances should be sent direct to that official.—A. J. H.

## AEROLOGICAL SOUNDINGS BY AIRPLANE IN RELATION TO THE BJERKNES THEORY OF CYCLONES

The final section of a paper under the above title by the Director of the Belgian Meteorological Institute presents the results of three airplane soundings over Belgium. We print a translation of M. Jaumotte's conclusions:

The few cases we have analyzed in this study show perfect agreement between facts and the Bjerknes theory. The cases of the degenerated cyclones prove that the separation of warm and cold air masses persists for a very long time, and that consequently the phenomenon of mixing has but a negligible importance. This is an important argument for the Norwegian school against that of Exner. It is recognized that the two schools have the same point of departure, viz, the juxtaposition of two air masses of different temperatures, considered by Margules as the source of the potential energy which the cyclone partly transforms into kinetic energy. According to Bjerknes the end result is a superposition of the tropical air over the polar; while according

year has been found very helpful in making comparison of any season's precipitation with normal.

How such a comparison can be made is shown on the diagram herewith presented. To the base diagram there has been added the mass curve of rainfall for the season 1926-27 from July 1 to December 31 which shows that rainfall at that time for the season 1926-27 was about 57 per cent of the normal annual rainfall, which amount is to be compared with 38 per cent of the normal annual, shown by the curve to be the normal to that date.

When the mass curve of rainfall for individual years is to be plotted on such a base diagram sufficient space above the 100 per cent line should be provided so that there will be room for the possible extreme annual. This in the case of California is somewhat in excess of 200 per cent.

As noted on the diagram the precipitation records at three stations—San Francisco, Sacramento, and Red Bluff—have been used in its preparation and the results apply to any point within an extensive region instead of to the three single stations alone. The normal monthly rainfall, always in percentage of the normal annual, is shown for each month in black. Each of these values is

entered at the end of the respective month. It is their summation which establishes the points on the main or mass-curve of the diagram. The curve though prepared for a region, may nevertheless be accepted as correctly representing the normal precipitation at each one of the three stations on whose composite record it is based, because the values in percentage of normal, at the three several points were in fair correspondence. The composite, in fact, probably better represents normal conditions at each of the stations than do their own particular records because the influence of local sources of error is minimized in the composite.

Where the rainfall year runs with the calendar year the time record on a similar diagram would, of course, begin with January 1 instead of with July 1.

To illustrate the use of the curve the following example may suffice: It is desired to know on December 31 how the rainfall of 7 inches since July 31, 1926, at a point between Sacramento and San Francisco having a normal annual of 15 inches, compares with normal precipitation.

The curve shows that the normal seasonal to December 31 should be 38 per cent of the normal annual precipitation, that is, in this case 38 per cent of 15 inches or 5.7 inches. The rainfall at the point in question was therefore  $(7 - 5.7 =)$  1.3 inches in excess of normal on December 31.

#### TORNADOES IN ARKANSAS IN MARCH, 1927

By. W. C. HICKMON

[U. S. Weather Bureau, Little Rock, Ark.]

Two destructive tornadoes occurred in this State in March, 1927. The first started at 7:30 p. m. of the 17th at the village of Delight, in Pike County, and moved thence some 70 miles northeastward to the border between Saline and Pulaski Counties, covering the distance in about an hour. Eleven persons were killed and 25 injured in this storm.

The second storm originated in Carroll County, south of Eureka Springs, moving thence east to Green Forest and thence east by south to Coin, and thence northeast to Denver, where it disappeared. This storm practically demolished the town of Green Forest, where 22 persons were killed and about 100 injured. Forty-eight houses were destroyed and 132 badly damaged; property loss was large.

The distribution of pressure on the 17th was not such as usually attends a tornado, the V-shaped trough with a southward or southwestward protrusion which Humphreys terms a normal but not invariable condition,<sup>1</sup> was notably missing on the 8 a. m. map; however, the moderate anticyclone to the northwestward was present and the temperature gradient was steep, temperatures of 30° to 36° obtaining in western Oklahoma at 8 a. m., while at Little Rock the temperature was 62°. The 8 p. m. map showed a weak cyclonic condition over the

Rockies and the southwest which, on the morning of the 18th, had become a disturbance of wide extent. The temperature gradient was still fairly steep and by 8 p. m. of the 18th the map was much nearer the tornado type.

#### A THUNDERSTORM WITH RAIN, HAIL, SLEET, AND SNOW

A thunderstorm at St. Joseph, Mo., on the afternoon of March 19, 1927, was accompanied by rain, hail, sleet, and snow, a most unusual phenomenon. The storm came from the southwest in connection with an area of low barometric pressure central in southern Missouri at 7 p. m. of the 19th. The thunderstorm began at 1:42 p. m., and moderate thunder was heard at frequent intervals until 4:22 p. m. A rather heavy fall of hail began at 2:35 p. m., and continued for three minutes. The hail was preceded, accompanied, and followed by rain, and from 3:41 p. m. to 5:10 p. m., the rain was mixed with sleet, which in turn was followed by light mist. The hailstones were quite uniform in size, about one-fourth inch in diameter, and consisted of soft opaque centers surrounded by clear ice, while the sleet ranged from about the size of large shot to very small particles. The rain with temperature below freezing caused a light covering of glaze, and icicles 1 to 2 inches in length formed on wires and limbs of trees. The amounts of hail and sleet were about equal and when melted gave approximately 0.09 inch of water. During the progress of the thunderstorm snow flurries were noted in the northern portion of the city. The temperature at the time of the hail was 31° F., and while the sleet was falling it stood at 30°. During the storm the wind movement ranged from 7 to 11 miles per hour from the northeast, backing to north, and the barometer remained nearly stationary at slightly below normal. The total precipitation was 0.47 inch.—*W. S. Belden.*

#### METEOROLOGICAL SUMMARY FOR SOUTHERN SOUTH AMERICA, FEBRUARY, 1927

By J. B. NAVARRETE, Director

[Observatorio del Salto, Santiago, Chile]

February was characterized by increase in the activity of the atmospheric circulation over the far south. In the Central Zone the weather was settled and toward the end of the month the heat of summer began to decline.

The most important depressions were those of the 14th and 23d; the first of these affected the Central Zone to some extent, rain occurring as far north as Valdivia Province. The second depression was more intense; it affected the whole Southern Zone as far north as Concepcion, causing extremely heavy winds and rains. Maximum rainfalls varied between 26 and 46 mm.

The most important anticyclonic régimes developed between the 1st and the 5th, 15th and 22d, and 24th to 28th, and were characterized by general fine weather, and by strong southerly winds between the coasts of Chiloe and Arauco.—*Transl. B. M. V.*

<sup>1</sup> W. J. Humphreys, *The Tornado*. Mo. Wea. Rev., Dec., 1926.